NUREG-0800
(formerly issued as
NUREG-75/087)

Standard Review Plan

for the Review of Safety Analysis Reports for Nuclear Power Plants

LWR Edition

U.S. Nuclear Regulatory Commission

Office of Nuclear Reactor Regulation

June 1987

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(This June 1987 update includes all revisions issued between July 1981 and June 1987.)

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INTRODUCTION

The Standard Review Plan (SRP) is prepared for the guidance of staff reviewers in the Office of Nuclear Reactor Regulation in performing safety reviews of applications to construct or operate nuclear power plants. The principal purpose of the SRP is to assure the quality and uniformity of staff reviews and to present a well-defined base from which to evaluate proposed changes in the scope and requirements of reviews. It is also a purpose of the SRP to make information about regulatory matters widely available and to improve communication and understanding of the staff review process by interested members of the public and the nuclear power industry.

The safety review is primarily based on the information provided by an applicant in a Safety Analysis Report (SAR). Section 50.34 of 10 CFR 50 of the Commission's regulations requires that each application for a construction permit for a nuclear facility shall include a Preliminary Safety Analysis Report (PSAR) and that each application for a license to operate such a facility shall include a Final Safety Analysis Report (FSAR). The SAR must be sufficiently detailed to permit the staff to determine whether the plant can be built and operated without undue risk to the health and safety of the public. Prior to submission of an SAR, an applicant should have designed and analyzed the plant in sufficient detail to conclude that it can be built and operated safely. The SAR is the principal document in which the applicant provides the information needed to understand the basis upon which this conclusion has been reached.

Section 50.34 specifies, in general terms, the information to be supplied in a SAR. The specific information required by the staff for an evaluation of an application is identified in Regulatory Guide 1.70, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants - LWR Edition." The SRP sections are keyed to the Standard Format, and the SRP sections are numbered according to the section numbers in the Standard Format. Review plans have not been prepared for SAR sections that consist of background or design data which are included for information or for use in the review of other SAR sections.

The Standard Review Plan is written so as to cover a variety of site conditions and plant designs. Each section is written to provide the complete procedure and all acceptance criteria for all of the areas of review pertinent to that section. However, for any given application, the staff reviewers may select and emphasize particular aspects of each SRP section as is appropriate for the application. In some cases, the major portion of the review of a plant feature may be done on a generic basis with the designer of that feature rather than in the context of reviews of particular applications from utilities. In other cases a plant feature may be sufficiently similar to that of a previous plant so that a de novo review of the feature is not needed. For these and other similar reasons, the staff may not carry out in detail all of the review steps listed in each SRP section in the review of every application.

The individual SRP sections address, in detail, who performs the review, the matters that are reviewed, the basis for review, how the review is accomplished, and the conclusions that are sought. The safety review is performed by 25 primary branches. One of the objectives of the SRP is to assign the review responsibilities to the various branches and to define the sometimes complex interfaces between them. Each SRP section identifies the branch that has the primary review responsibility for that section. In some review areas the primary branch may require support, and the branches that are assigned these secondary review responsibilities are also identified for each SRP section.

Each SRP is organized into four subsections as follows:

I. Areas of Review

This subsection describes the scope of review, i.e., what is being reviewed by the branch having primary review responsibility. This subsection contains a description of the systems, components, analyses, data, or other information that is reviewed as part of the particular Safety Analysis Report section in question. It also contains a discussion of the information needed or the review expected from other branches to permit the primary review branch to complete its review.

II. Acceptance Criteria

This subsection contains a statement of the purpose of the review, an identification of which NRC requirements are applicable, and the technical basis for determining the acceptability of the design or the programs within the scope of the area of review of the SRP section. The technical bases consist of specific criteria such as NRC Regulatory Guides, General Design Criteria, Codes and Standards, Branch Technical Positions, and other criteria.

The technical bases for some sections of the SRP are provided in Branch Technical Positions or Appendices which are included in the SRP. These documents typically set forth the solutions and approaches determined to be acceptable in the past by the staff in dealing with a specific safety problem or safety-related design area. These solutions and approaches are codified in this form so that staff reviewers can take uniform and well-understood positions as the same safety problems arise in future cases. Some Branch Technical Positions and Appendices may be converted into Regulatory Guides if it appears that this step would aid the review process. Like Regulatory Guides, the Branch Technical Positions and Appendices represent solutions and approaches that are acceptable to the staff, but they are not required as the only possible solutions and approaches. However, applicants should recognize that, as in the case of Regulatory Guides, substantial time and effort on the part of the staff has gone into the development of the Branch Technical Positions and Appendices and that a corresponding amount of time and effort will probably be required to review and accept new or different solutions and approaches. Thus, applicants proposing solutions and approaches to safety problems or safety-related design areas other than those described in the Branch Technical Positions and Appendices must expect longer review times and more extensive questioning in these areas. The staff is willing to consider proposals for other solutions and approaches on a generic basis, apart from a specific license application, to avoid the impact of the additional review time on individual cases.

III. Review Procedures

This subsection discusses how the review is accomplished. The section is generally a step-by-step procedure that the reviewer goes through to provide reasonable verification that the applicable safety criteria have been met.

IV. Evaluation Findings

This subsection presents the type of conclusion that is sought for the particular review area. For each section, a conclusion of this type is included in the staff's Safety Evaluation Report in which the staff publishes the results of their review. The SER also contains a description of the review including such subjects as which aspects of the review were selected or emphasized; which matters were modified by the applicant, require additional information, will be resolved in the future, or remain unresolved; where the plant's design or the applicant's programs deviate from the criteria stated in the SRP; and the bases for any deviations from the SRP or exemptions from the regulations.

V. References

This subsection lists the references used in the review process.

The SRP and the Standard Format are directed toward water-cooled reactor power plants. Staff reviewers will adapt the SRP for use in the reviews of other reactor types where applicable.

The Standard Review Plans result from many years of experience by the staff in establishing and using regulatory requirements in evaluating the safety of nuclear power plants and in reviewing Safety Analysis Reports. A great deal of progress has been made in the methods of review and in the development of regulations, guides, and standards since the early years of review. This Standard Review Plan may be considered a part of a continuing regulatory standards development activity that not only documents current methods of review but also provides the base of orderly modifications of the review process in the future.

In 1981, the Standard Review Plan was revised in entirety and published as NUREG-0800. The revision program had three major objectives, i.e., to more completely identify the NRC requirements that are germane to each review topic, to more fully describe how the review effort determines satisfaction of the requirement, and to incorporate the large number of new and revised regulatory positions (primarily TMI-related) that had already been established. To accomplish this and to conform to the revised NRR organization, some SRP sections were added, deleted, split, and/or combined.

The SRP will be revised and updated periodically as the need arises to clarify the content or correct errors and to incorporate modifications approved by the Director of the Office of Nuclear Reactor Regulation. A revision number and publication date are printed at a lower corner of each page of each SRP section. Since individual sections have been, and will continue to be, revised as needed, the revision numbers and dates will not be the same for all sections. The Table of Contents indicates the revision numbers of the currently effective sections. As necessary, corresponding changes to the Standard Format will

also be made. Comments and suggestions for improvement will be considered and should be sent to the Director, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555. Notices of errors or omissions should also be sent to the same address.

U.S. NUCLEAR REGULATORY COMMISSION

NUREG-0800

"STANDARD REVIEW PLAN FOR THE REVIEW OF SAFETY ANALYSIS REPORTS FOR NUCLEAR POWER PLANTS"

NOTICE OF ISSUANCE AND AVAILABILITY

REVISED TABLE OF CONTENTS

The U.S. Nuclear Regulatory Commission (NRC) has published a revision to the "Table of Contents" of NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," LWR Edition (SRP).

The table of contents, Revision 5 incorporates all Standard Review Plan Sections that have been revised and issued since NUREG-0800 was issued in July 1981. All changes resulting from incorporating the revised SRP Sections and a few editorial changes are identified by a line in the margin of the revised Table.

A copy of the revised Table is expected to be available in the Public Document Room within 2 weeks. Copies of the revised SRP Sections or of the complete Standard Review Plan, NUREG-0800, Accession No. PD-81-920199, are available for purchase from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161; telephone (703) 487-4650.

Dated at Bethesda, Maryland this 26 day of December 1984.

FOR THE NUCLEAR REGULATORY COMMISSION

Edson G. Case, Acting Director
Office of Nuclear Reactor Regulation

STANDARD REVIEW PLAN FOR THE REVIEW OF SAFETY

ANALYSIS REPORTS FOR NUCLEAR POWER PLANTS

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(1)SRP Section has been combined with SRP Section 12.3.
(2)SRP Section has been combined with SRP Section 13.1.2.
(3)SRP Section has been replaced by SRP Sections 13.2.1 and 13.2.2.
(4)SRP Section has been replaced by SRP Sections 13.5.1 and 13.5.2.

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Compilation of Branch Technical Positions

Branch Technical Position (BTP) No.	Title of BTP	BTP Location
ASB 3-1 (Formerly APCSB 3-1)	"Protection Against Postulated Piping Failures in Fluid Systems Outside Containment"	3.6.1
ASB 3-2* (Formerly AAB 3-2)	"Tornado Design Classification"	3.5.1.4
ASB 9-1*	"Overhead Handling Systems For Nuclear Power Plants"	9.1.4
ASB 9-2	"Residual Decay Energy for Light-Water Reactors for Long-Term Cooling"	9.2.5
ASB 10-1	"Design Guidelines For Auxiliary Feedwater System Pumps Drive and Power Supply Density For PWRs"	10.4.9
ASB 10-2	"Design Guidelines For Water Hammers in Steam Generators with Top Feedring Designs"	10.4.7
CMEB 9.5-1 (Formerly ASB 9.5-1)	"Guidelines For Fire Protection For Nuclear Power Plants"	9.5.1
CSB 6-1	"Minimum Containment Pressure Model For PWR ECCS Performance Evaluation"	6.2.1.5
CSB 6-2*	"Control of Combustible Gas Concentrations In Containment Following a Loss of Coolant Accident"	6.2.5
CSB 6-3	"Determination of Bypass Leakage Paths in Dual Containment Plants"	6.2.3
CSB 6-4	"Containment Purging During Normal Plant Operations"	6.2.4
CPB 4.3-1	"Westinghouse Constant Axial Offset Control (CAOC)"	4.3
ETSB 11-3	"Design Guidance For Solid Radioactive Waste Management Systems Installed In Light-Water-Coolant Nuclear Reactor Plants"	11.4
ETSB 11-5	"Postulated Radioactive Releases Due to a Waste Gas System Leak or Failure"	11.3
HGEB 1 (Formerly HMB/GSB 1)	"Safety-Related Permanent Dewatering Systems"	2.4.12
ICSB 1	"Backfitting of the Protection and Emergency Power Systems of Nuclear Power Reactors"	Appendix 7-A
ICSB 3	"Isolation of Low Pressure Systems From the High Pressure Reactor Coolant System"	Appendix 7-A
ICSB 4	"Requirements of Motor-Operated Valves in the ECCS Accumulator Lines"	Appendix 7-A

Branch Technical Position (BTP) No.	Title of BTP	BTP Location
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ICSB 9*	"Definition of Use of Channel Calibration-Technical Specification"	Appendix 7-A
ICSB 12	"Protection System Trip Point Changes For Operation with Reactor Coolant Pumps Out of Service"	Appendix 7-A
ICSB 13	"Design Criteria for Auxiliary Feedwater Systems"	Appendix 7-A
ICSB 14	"Spacious Withdrawal of Single Control Rods in Pressurized Water Reactors"	Appendix 7-A
ICSB 16	"Control Element Assembly (CEA) Interlocks in Combustion Engineering Reactors"	Appendix 7-A
ICSB 19	"Acceptability of Design Criteria For Hydrogen Mixing and Drywell Vacuum Relief Systems"	Appendix 7-A
ICSB 20	"Design of Instrumentation and Controls Provided to Accomplish Changeover From Injection to Recirculation Mode"	Appendix 7-A
ICSB 21	"Guidance For Application of Regulatory Guide 1.47"	Appendix 7-A
ICSB 22	"Guidance For Application of Regulatory Guide 1.22"	Appendix 7-A
ICSB 25*	"Guidance For the Interpretation of General Design Criterion 37 For Testing the Operability of the Emergency Core Cooling System as a Whole"	Appendix 7-A
ICSB 26	"Requirements for Reactor Protection System Anticipatory Trips"	Appendix 7-A
ICSB 2 (PSB)	"Diesel-Generator Reliability Qualification Testing"	Appendix 8-A
ICSB 4 (PSB)	"Requirements on Motor-Operated Valves in the ECCS Accumulator Lines"	Appendix 8-A
ICSB 8 (PSB)	"Use of Diesel-Generator Sets for Peaking"	Appendix 8-A
ICSB 11 (PSB)	"Stability of Offsite Power Systems"	Appendix 8-A
ICSB 15 (PSB)	"Reactor Coolant Pumps Breaker Qualifications"	Appendix 8-A
ICSB 17 (PSB)	"Diesel-Generator Protective Trip Circuit Bypasses"	Appendix 8-A
ICSB 18 (PSB)	"Application of the Single Failure Criterion to Manually Controlled Electrically-Operated Valves"	Appendix 8-A
ICSB 21	"Guidance For Application of Regulatory Guide 1.47"	Appendix 8-A

Branch Technical Position (BTP) No.	Title of BTP	BTP Location
MTEB 5-2	"Fracture Toughness Requirements"	5.3.2
MTEB 5-3	"Monitoring of Secondary Side Water Chemistry In PWR Steam Generators"	5.4.2.1
MTEB 5-7*	"Material Selection and Processing Guidelines For BWR Coolant Pressure Boundary Piping"	5.2.3
MTEB 6-1	"PH For Emergency Coolant Water for PWPs"	6.1.1
MEB 3-1	"Postulated Rupture Locations In Fluid System Piping Inside and Outside Containments"	3.6.2
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RSB 3-1	"Classification of Main Steam Components Other than the Reactor Coolant Pressure Boundary For BWR Plants"	Appendix A to 3.2.2
RSB 3-2	"Classification of BWR/6 Main Steam and Feedwater Components Other Than the Reactor Coolant Pressure Boundary"	Appendix B to 3.2.2
RSB 5-1	"Design Requirements of the Residual Heat Removal System"	5.4.7
RSB 5-2	"Overpressurization Protection of Pressurized Water Reactors While Operating at Low Temperatures"	5.2.2
RSB 6-1	"Piping From the RWST (or BWST) and Containment Sump(s) to the Safety Injection Pumps"	6.3

*BTP has been superceeded.